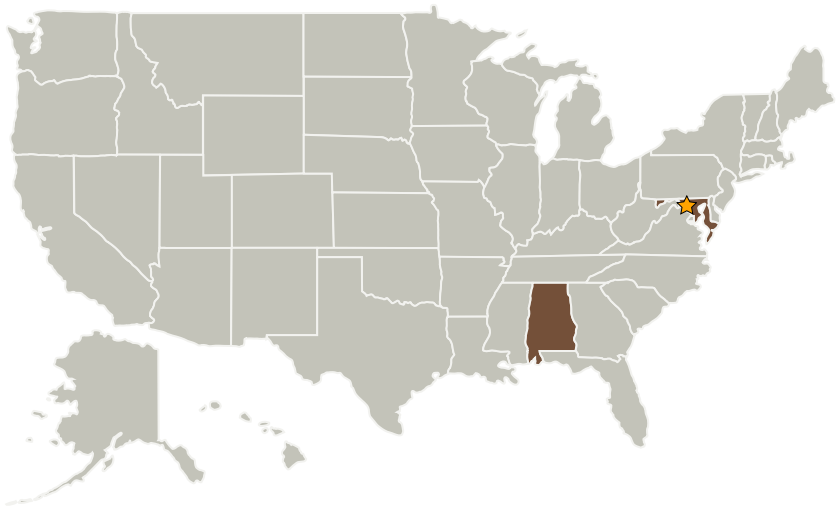
Hybrid Guidance System for Relative Navigation, Phase I

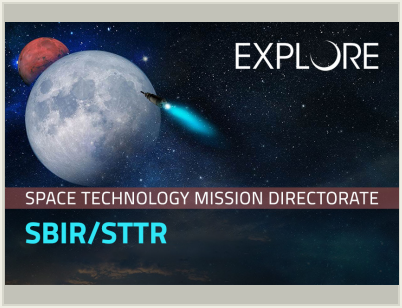
Completed Technology Project (2006 - 2006)

Project Introduction

Future NASA architectures and missions will involve many distributed platforms that must work together. This in turn requires guidance, navigation and control (GN&C) technology such as systems that determine spacecraft relative range and attitude. The proposed Hybrid Guidance System (HGS) will be such a system, providing increased relative navigation accuracy and robustness while reducing mass, volume, and power consumption by a factor of 2 to 4. The HGS's key innovation is integration of three proven and developed sensor technologies (laser-based retro-image pattern matching, laser range-finding, and correlation) into a low-power package. We will develop non-linear navigation estimation algorithms to fuse the sensor outputs together as well as to integrate the system output with other on-board navigation systems. The state estimate generation using three different techniques will increase the system's robustness through the ability to reject faulty measurements from one component of the system. Phase I of the SBIR will verify feasibility of the HGS design and the navigation algorithms and will culminate in a realistic mission simulation of vehicles using the HGS as part of an integrated GN&C system. The results of this simulation will serve as an excellent springboard to Phase II HGS prototype hardware and embedded software development.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Advanced Optical Systems, Inc.	Supporting Organization	Industry	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.7 Guidance, Navigation and Control (GN&C) for EDL